DT Local reconstruction efficiency in MTCC data

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Description

- Will show preliminary studies of DT segments efficiency in MTCC data
- General idea:
  - select good segments in two chambers;
  - extrapolate (straight line) position to a third chamber;
  - check if extrapolation is inside chamber;
  - check if a segment is present, close ($\Delta < 10\ cm$), good (nHits> 5, $\chi^2/NDoF < 20$) ...
- For MB2 and MB3 use a *sandwich* pattern, for MB1 and MB4 not possible, use MB2 and MB3.
- Use Run with RPC trigger to avoid bias;
- For this talk used $B = 4\ T$ run (4398).

- MB2 using sandwich of MB1 and MB3 in wheel $+1$, sector 10 (also in the following);

- In red efficiency vs x or y excluding first and last bin in opposite coordinate (remove border effect);

- In blue using ful chamber.
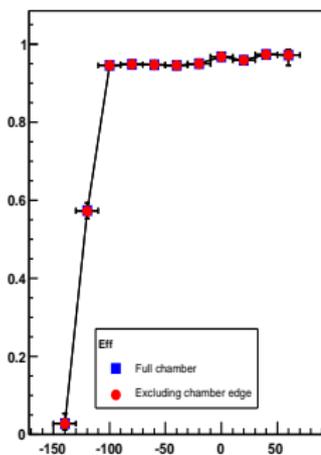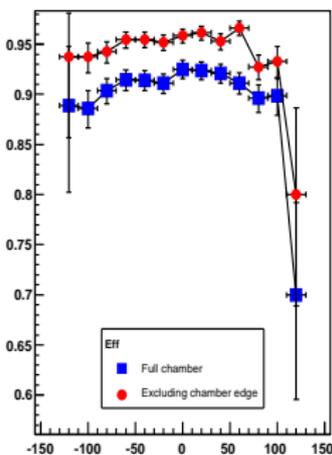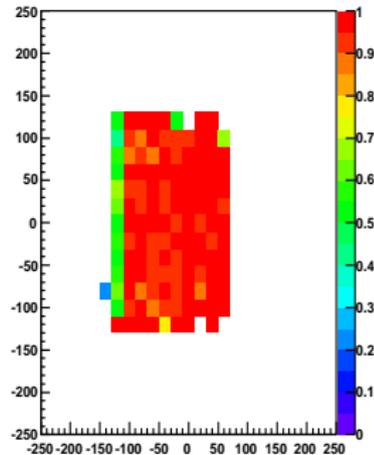
- MB3 using sandwich of MB2 and MB4
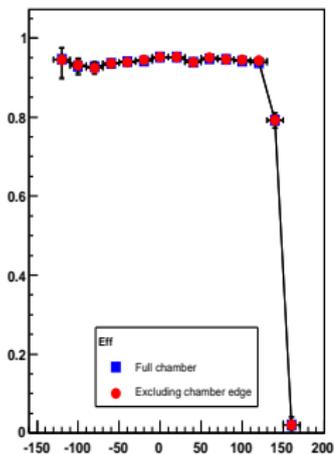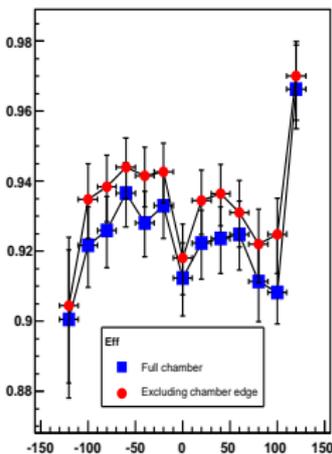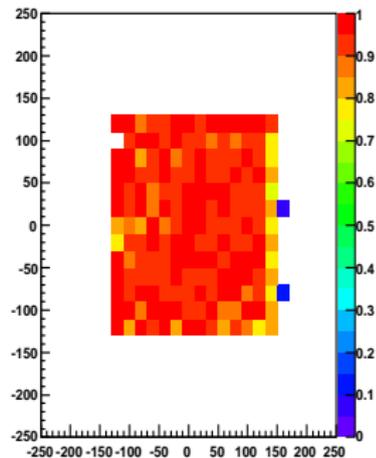
- MB1 using of MB2 and MB3
- Efficiency is significantly lower ($\sim 85\%$)
- Most probably an effect of the bending even if the central plateau
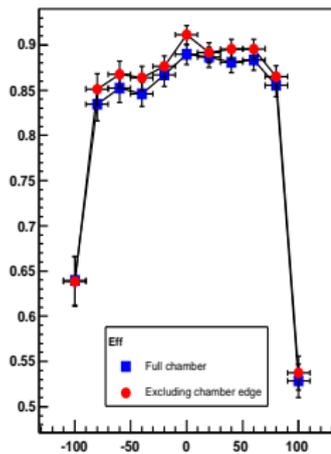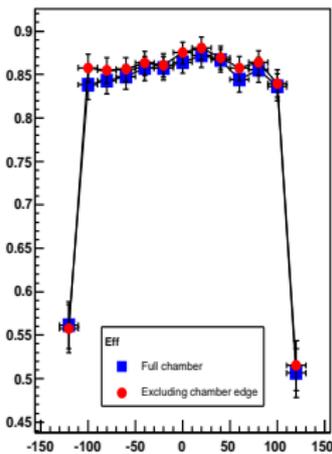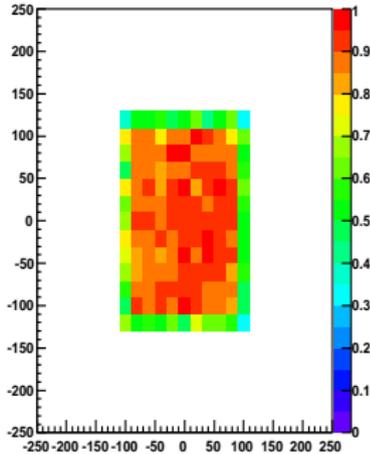
- MB1 using of MB2 and MB3
- If we consider the very central part of the chamber, $\epsilon \gtrsim 90\%$
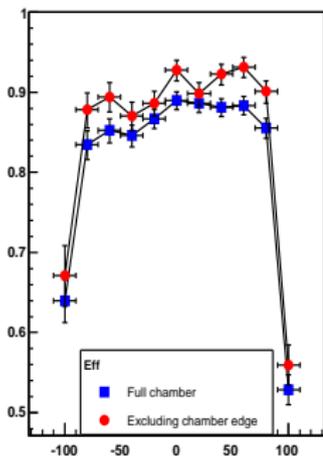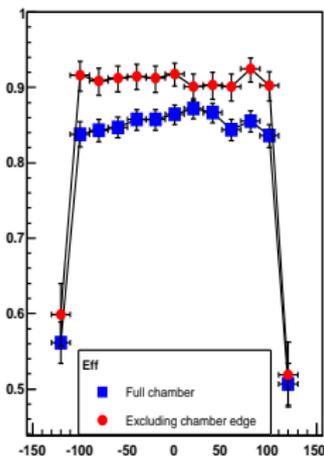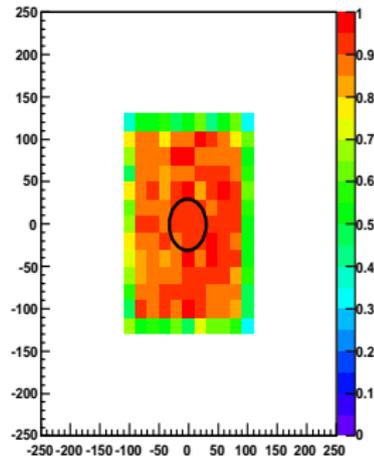
- Cross check: consider MB2 efficiency by using MB3 and MB4
- Plateau $\epsilon \sim 87\%$ (was $\epsilon \sim 95\%$ with sandwich)
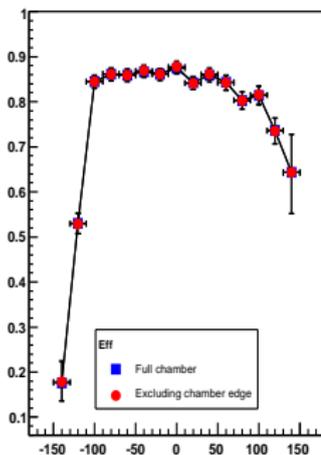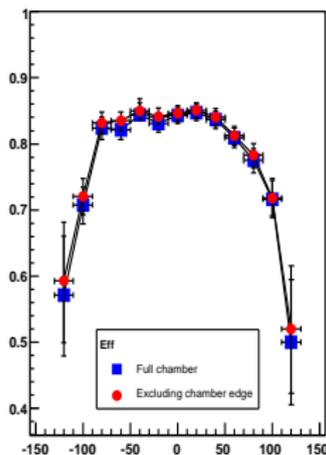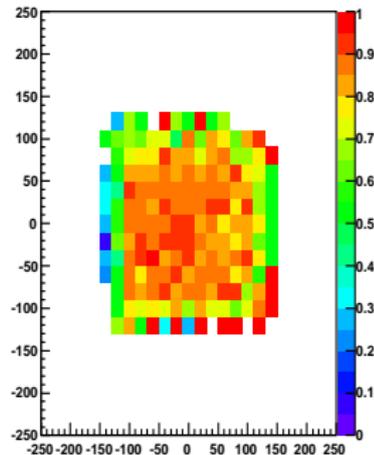
- MB4 (sect 10) using sandwich of MB2 and MB3
- Efficiency is even lower ($\sim 82\%$)
- Expect a non negligible range out effect in addition to bending
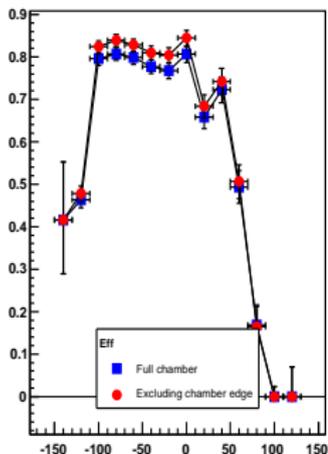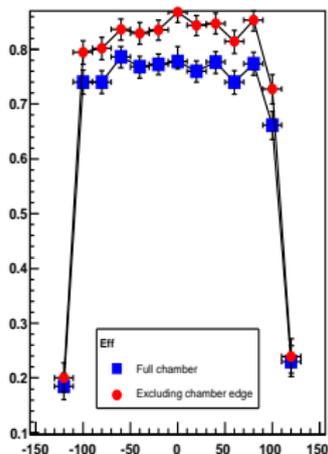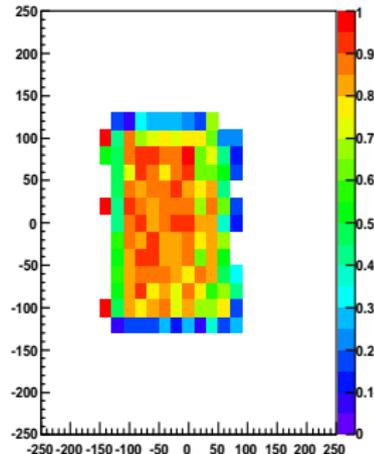
- Cross check: consider MB3 efficiency by using MB1 and MB2
- Plateau $\epsilon \sim 83\%$ (was $\epsilon \sim 94\%$ with sandwich)
- Have to consider different geometry: only half MB4 (sect 10) was considered
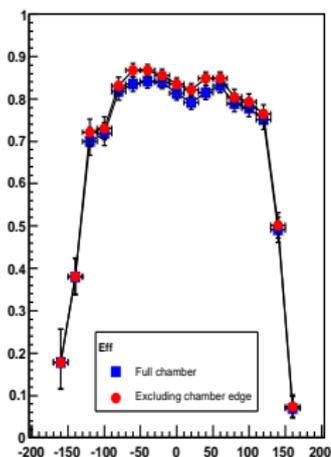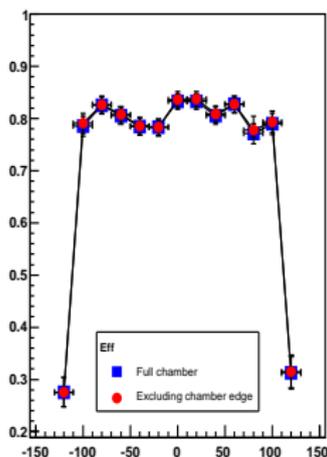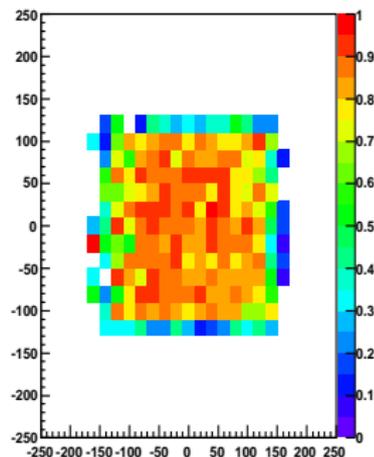
More results

- Similar result are obtained for wheel $+2$ sector 10
- Results for wheel $+2$ sector 11 available but less significant due to sector inclination (below MB2 and MB3).
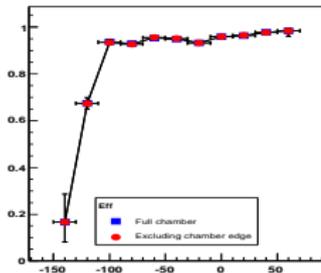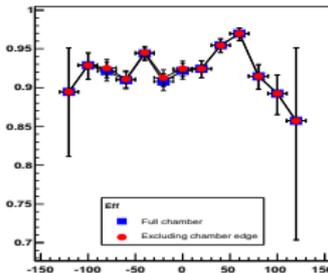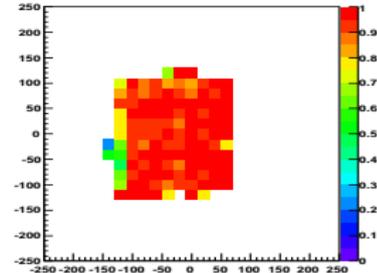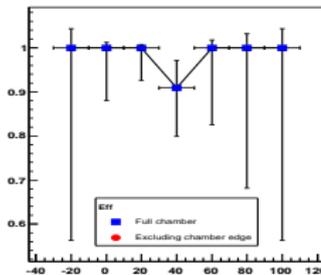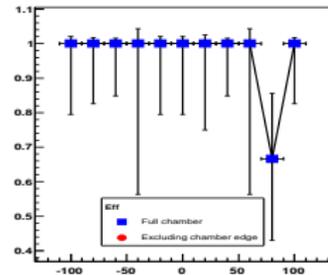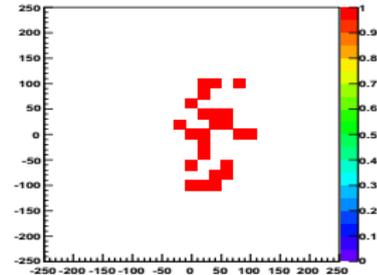
$B = 0$ T run

- Run also on $B = 0$ T (always with RPC trigger) (Run 4333)
- Results are coerent with what found on $B = 4$ T run, with less border effect (below MB1 and MB4 wheel 2, sector 10)
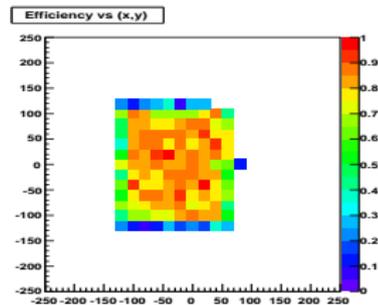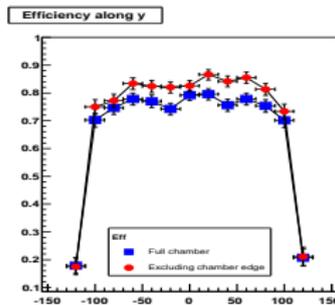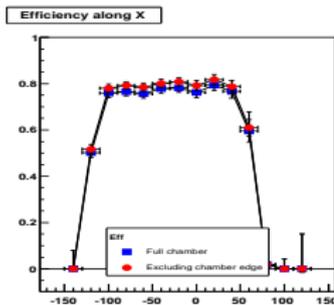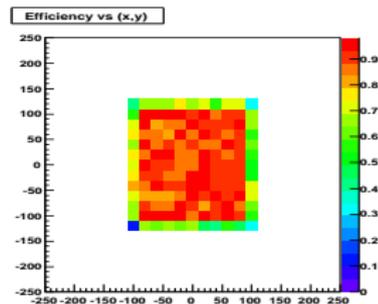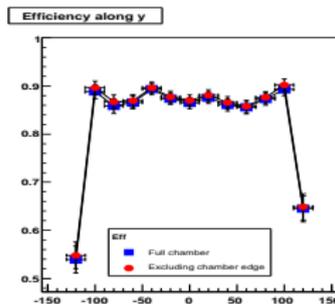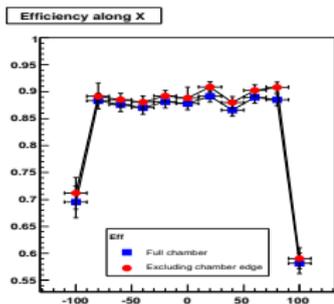
To Do list

- There are still a lot of geometrical acceptance effect to be studied and undesrstood;
- Overall plateau efficiency is $\sim 95\%$: what happen to other 5%?
- Fraction is reconstructed but badly or too far away: why?
- Should extend the study also to layer hits;
- I've tried write clean and reusable code, which can be used with any combination of chambers (also not in the same wheel-sector)
- Can be used for high level DQM

Conclusion

- Preliminary studies on segment reconstruction based on MTCC data shown
- Overall efficiency is good, but still to undestand where (and why) do we lose segments
- Once cleaned-up, code will be committed and can be used also for DQM
- off-topic: today I'll commit code for improved segment reconstruction as shown in last meeting. Sorry for delay...